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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named Inventor:	DANIEL J. WILKINSON		
Application No.:	10/605,988	Group Art Unit:	3673
Filed:	November 12, 2003	Examiner:	V.A. Patel
Title:	PISTON RING ASSEMBLY		

MAIL STOP APPEAL BRIEF – PATENTS
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APPEAL BRIEF

Honorable Sir:

This brief is in furtherance of the Notice of Appeal, which was timely filed in connection with the above-captioned application on December 28, 2006. Thus, it is submitted that this brief is timely filed. However, should an extension of time be deemed necessary, it is hereby requested and please charge the fees to Deposit Account No. 13-1816.

This Brief is being filed under the provisions of 37 CFR §41.37 and its related requirements. The fees required under 37 C.F.R. 41.20(b)(2) are submitted herewith.

(i) Real Party in Interest

The real party in interest, as evidenced by the assignment from the inventor recorded on November 17, 2003 at Reel/Frame 014701/0942, is Dana Corporation.

(ii) Related Appeals and Interferences

There is no known appeal or interference which will directly affect, or be directly affected by, or have a bearing on, the Board's decision in this Appeal.

(iii) Status of Claims

On December 28, 2006, applicant submitted a Notice of Appeal in connection with the subject application, appealing the final rejection of claims 1-18.

The status of each of the claims is as follows:

1. Claims cancelled: None;
2. Claims withdrawn from consideration but not cancelled: None;
3. Claims pending: 1-18;
4. Claims allowed: None;
5. Claims rejected: 1-18.

The claims on appeal are 1-18. A copy of the claims on file is submitted in the attached Claims Appendix.

(iv) Status of Amendments

No amendment was filed subsequent to the final rejection of the application by the Office Action of August 28, 2006.

(v) Summary of Claimed Subject Matter

The invention as defined in independent claim 1 is a piston ring assembly 10, comprising an upper ring 12 and a lower ring 14. Paragraph 0012, page 3 lines 20-21. A first portion 24 of the upper ring 12 is in contact with a corresponding first portion 26 of the lower ring 14. Paragraph 0013, page 4 lines 5-6. An expander 22 is positioned between corresponding second portions 16, 18 of the upper ring 12 and the lower ring 14. Paragraph 0012, page 4 lines 2-4. The expander 22 includes apexes 44 adapted to contact the second portions 16, 18 of the upper and lower rings 12, 14. Paragraph 0015, page 5 lines 5-11. Radial compression of the upper and lower rings 12, 14 induces axial expansion of the expander 22. Paragraph 0021, page 7 lines 7-16.

The invention as defined in independent claim 9 is a piston ring assembly 10 for retention in a ring groove 34 of a piston 36 of an internal combustion engine. Paragraph 0017, page 5 lines 23-24. The assembly 10 comprises an upper ring 12 for bearing against an upper surface 48 of the piston ring groove 34, and a lower ring 14 for bearing against a lower surface 50 of the piston ring groove 34. Paragraph 0022, page 8 lines 5-7. The upper ring 12 defines a first shoulder recess 16 about an inner periphery thereof, and the lower ring 14 defines a second shoulder recess 18 about an inner periphery thereof. Paragraph 0012, page 3 lines 20-24. A first portion of the upper ring 12 is in direct contact with a corresponding first potion of the lower ring 14. Paragraph 0013, page 4 lines 5-6. The first and second recesses 16, 18 define a cavity 20. Paragraph 0012, page 3 line 24 to page 4 line 2. A generally sinusoidal expander 22 is received in the cavity 20, the generally sinusoidal expander 22 having alternating apexes 44. Paragraph 0015, page 5 lines 5-11. The apexes 44 are adapted to contact

second corresponding portions of the upper and lower rings, wherein radial compression of the upper and lower rings 12, 14 induces axial expansion of the generally sinusoidal expander 22 for urging the upper and lower rings 12, 14 against the upper and lower surfaces 48, 40 of the piston ring groove 34. Paragraph 0022, page 8 lines 1-7.

(vi) Grounds of Rejection to be Reviewed on Appeal

The issues for appeal are:

a) Whether claims 1-3, 6-7 and 17 are anticipated under 35 U.S.C. §102(b) by Fall (US 2,349,903).

b) Whether claims 4,9-10, 12-13, 15-16 and 18 are unpatentable under 35 U.S.C. 103(a) over Fall in view of Landon (US 2,323,815).

c) Whether claims 5 and 11 are unpatentable under 35 U.S.C. 103(a) over Fall and Landon.

d) Whether claim 8 is unpatentable under 35 U.S.C. 103(a) over Fall in view of Wuerfel (Re. 20,256).

e) Whether claim 14 is unpatentable under 35 U.S.C. 103(a) over Fall and Landon, and further in view of Wuerfel.

(vii) Argument.

a) Claims 1-3, 6-7 and 17 are not anticipated by Fall.

1) Claim 1

The Examiner has taken the position that Fall discloses a piston ring assembly (figure 4) for retention in a ring groove of a piston of an internal combustion engine. The piston ring assembly comprises an upper ring (10) for bearing against an upper surface of the piston ring groove, a lower ring (11) for bearing against a lower surface of the piston ring groove, a first shoulder recess (recess that retains the expander (18) about an inner periphery of the upper ring), a second shoulder recess (recess that retains the expander (18) about an inner periphery of the lower ring), a first portion of the upper ring is in contact with a corresponding first portion of the lower ring (where upper ring and lower ring 10 and 11 contact each other, see figure 4), a generally sinusoidal expander (18) having alternating apexes (apexes 15b of the expander 18 not shown in figure 4 but shown "as example" in figure 1), the generally sinusoidal expander received in a cavity formed by the first shoulder recess and the second shoulder recess.

The Examiner further asserts that radial compression of the upper and lower rings induces axial expansion of the generally sinusoidal expander, maintaining that this is the case since the upper ring, the lower ring and the expander have the same structure as claimed by applicants, and that furthermore upper and lower rings and the expander are split rings. Specifically, the Examiner alleges that Fall teaches that the expansion of the expander in an axial direction is possible as noted on page 1, lines 33-37 due to compression of the upper and lower rings. The Examiner also argues that, "[b]ecause the split of the expander is capable of being made relatively small and large, axial compression of the expander is necessary to provide this. Furthermore due to

large pressure placed on the upper or lower ring the expander would also compress in the axial direction of the piston ring assembly."

The present invention, as defined in claim 1, is patentable over Fall. Claim 1 defines a piston ring assembly and includes the limitation, "wherein radial compression of said upper and lower rings induces axial expansion" of the claimed expander.

Contrary to the assertions of the Examiner, Fall completely fails to teach or suggest this limitation. First, Fall is devoid of any statement that its expander ring undergoes axial expansion. In fact, that portion of Fall referenced by the Examiner (column 2 of page 1, lines 33-37) reads: "The ring 15 is split at 15c in order that it may expand or contract as required by the ring segments 10 and 11 and the cylinder 14 in which the piston assembly is being used."

Thus, the referenced text does *not* state that axial expansion of Fall's expander ring is possible. It merely says that the ring 15 may expand or contract, without referring to either the radial or axial direction. Moreover, as explained further below, Fall's disclosure clearly indicates that the referenced expansion is radial, not axial.

Given the foregoing, the only possible basis for the Examiner's assertion that Fall discloses the claimed expander is that Fall somehow *inherently* discloses an axially expanding expander ring. In this regard, however, the Examiner concedes that - at most - such axial expansion "is possible." Thus, even if the Examiner's characterization were correct, Fall does not satisfy the legal standard for inherent anticipation. Under established Federal Circuit precedent, "Inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." *MEHL/Biophile Int'l Corp. v. Milgraum,* 192 F.3d

1362, *1365,* 52 USPQ2d 1303 (Fed. Cir. 1999) (emphasis added) (citations omitted); *see also Transclean Corp. v. Bridgewood Services,* 290 F.3d 1364, 1373, 62 USPQ2d 1865 (Fed. Cir. 2002) ("anticipation by inherent disclosure is appropriate only when the reference discloses prior art that *must necessarily* include the unstated limitation") (emphasis added); Manual of Patent Examining Procedure ("MPEP") § 2112, IV ("The fact that a certain result or characteristic occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic") (original emphasis). Accordingly, Fall does not inherently anticipate the claimed invention.

Second, contrary to the Examiner's assertion, nothing in Fall suggests even that axial expansion of expander ring 18 "is possible." To the contrary, Fall expressly states that its expander ring expands radially. In support of his rejection, the Examiner relies on the embodiment of Figure 4 from Fall, stating that "The expander ring 18 [of Figure 4] is similar to the expander ring 15 in the form of the invention shown in Figures 1, 2, and 3, but is considerably narrower." Fall at column 3, page 2, lines 15-18. As shown in Figure 1, expander ring 15 has ***radially directed*** "corners l5b . . . bearing against the back of the main portions of the ring segments 10 and 11." Fall at column 2, page 1, lines 30-33.

Fall describes the expansion of its expander ring as follows:

> [T]he corners 15b bear against the ring segments 10 and 11, thus pressing the ring segments 10 and 11 ***radially outwardly*** with respect to the piston 13. With this arrangement, the exact pressure that may be desired between the ring segments 10 and 11 and the cylinder wall 14 may be secured, and this pressure will be uniformly distributed

around the entire circumference of the ring segments. Fall at column 2, page 1, lines 40-48 (emphasis added).

The expander ring 15 is polygonal in plan view, allowing it to radially expand and contract. Fall at column 2, page 1, lines 27-33. As shown in Fall's Figure 4, ring segments 10 and 11 include axially extending flange portions that abut expander ring 18 in the radial direction. As a result, the radial compression of rings 10 and 11 induces *radial* compression of expander ring 18, which constricts the expander ring and affects the size of its split, as shown in Fall's Figure 1, with the radial expansion and contraction of expander ring 15 causing split 15c to widen or narrow. There is simply no reason to think that radial compression of the upper and lower rings would or even could result in axial expansion of the expander ring of Fall.

According to the Examiner, Fall inherently anticipates the rejected claims because "the lower ring and the expander have the same structure as claimed by applicants." While, the rejected claim 1 has certain structural features in common with Fall, those similarities do not establish anticipation. Claim 1 positively recites the structure of a piston ring assembly such that "radial compression of said upper and lower rings induces axial expansion of said expander." There is no basis for assuming that Fall will satisfy this limitation simply because it has certain other structural features in common with claim 1. In effect, the Examiner's argument writes out the "axial expansion" feature of Applicant's claims, which is improper.

As Fall fails to describe <u>each and every element</u> as set forth in claim 1, Fall does not anticipate the invention as defined in claim 1. *Verdegaal Bros. v. Union Oil Co. of*

California, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Further, claims 2-3, 6-7 and 17 each depend from claim 1, and are not anticipated by Fall at least on that basis.

2) Claim 17

Claim 17 depends from claim 1, further defining the piston ring assembly wherein the cavity has a radial thickness, the expander has a radial thickness, and "the expander radial thickness is greater than the cavity radial thickness."

With regard to claim 17, the Examiner suggests in the Office Action that the radial thickness of the Fall expander is greater than the radial thickness of the cavity. It is further stated that the Fall expander has a radial thickness starting from inside of the cavity and extending to the piston, example is shown in figure 1.

While Fall's rings 10 and 11 may have recesses that define a cavity, expander 18 does not have a radial thickness that is greater than the radial thickness of that cavity. This is clearly shown in Fall's Figure 4.

Accordingly, claim 17 is patentable over Fall for this additional reason.

b) Claims 4, 9-10, 12-13, 15-16 and 18 are patentable over Fall in view of Landon.

1) Claim 4

Claim 4 depends from claim 1, and is patentable based at least upon this dependency from a patentable base claim.

Moreover, claim 4 recites an expander having "two ends defining an expander gap such that radial compression of said upper and lower rings mates said two ends."

The Office Action lacks any assertion whatsoever that either Fall or Landon discloses this feature and, in fact, neither of them does. Thus, for this additional reason, claim 4 is patentable over Fall and Landon.

2) Claim 9

The Examiner maintains that Fall discloses that the expander is generally sinusoidal having a set of upper apexes and a set of lower apexes, the upper apexes contact the second portion of the upper ring, the lower apexes contact the second portion of the lower ring, the ends of the expander forming a W-shape configuration and the apexes are supported by two adjacent leg members such that an angle defined by the adjacent leg members is about 16 degrees. Landon is said to disclose a piston ring assembly having an upper ring and a lower ring, an expander between the upper ring and the lower ring, the expander being sinusoidal, where two upper apexes contact the upper ring and the two lower apexes contact the lower ring, ends of the expander forming a split configuration (gap between ends of the expander, figure 1), ends of the expander forming a W-shape configuration and the apexes are generally flat and are supported by two adjacent leg members such that an angle is defined by the adjacent legs members. The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the expander of Fall be replaced by the expander of Landon, to provide axial resilience for the expander, a substantial bearing area for the upper and lower rings and to minimize wear.

Claim 9 recites, *inter alia*, "wherein radial compression of said upper and lower rings induces axial expansion of said expander." For all of the reasons mentioned above, Fall does not teach or suggest this limitation. Landon also fails in this regard. Landon discloses a corrugated spacer member 3 positioned between two "relatively flat upper and lower oil-control members." Landon, column 2, page 1, lines 9-30. Because of the orientation of spacer member 3, it "exhibits some axial resilience." Landon, column 2, page 1, lines 35-37. However, nothing in Landon suggests that its flat control members can be radially compressed to induce axial expansion of corrugated spacer member 3. The Examiner asserts that "the expander of Landon is capable of being compressed to induce axial expansion." Regardless of whether the expander is capable of being compressed to induce axial expansion, claim 9 recites that *"radial compression of said upper and lower rings induces* axial expansion of the expander." Landon's flat control members cannot be radially compressed to induce the axial expansion of spacer member 3. In addition, there is no indication in Landon that the spacer member 3 even could be radially compressed to the extent required to mate the ends of the expander and induce axial expansion of the expander.

Moreover, even the Examiner concedes that, at most, it *is possible* to operate Landon's device to induce axial expansion. While applicant disagrees with the Examiner's characterization of Landon, such a possibility is insufficient to reject Applicant's claims. *MEHL/Biophile Int'l Corp. v. Milgraum,* 192 F.3d 1362, 1365, 52 USPQ2d 1303 (Fed. Cir. 1999).

For all of these reasons, the combined references do not disclose or suggest each limitation of the rejected claims and, therefore, do not render claim 9 obvious.

Further, the Examiner contends that it "would have been obvious ... to have the expander of Fall replaced by the expander of Landon, to provide axial resilience for the expander, a substantial bearing area of the upper and lower rings and to minimize wear." However, one of ordinary skill in the art would not be motivated to replace Fall's expander with that of Landon for several reasons. First, as explained above, the purpose of Fall's expander 18 is to "press[] the ring segments 10 and 11 radially outwardly with respect to the piston 13" so that "pressure will be uniformly distributed around the circumference of the ring segments." Fall at column 2, page 1, lines 42-48. However, because Landon's spacer member 3 is axially corrugated, it would not provide the radial pressure that Fall requires. Thus, if Fall and Landon were combined in the manner suggested by the Examiner, Fall would not work for its intended purpose. *See In re John R Fritch,* 972 F.2d 1260, 1265 n.12 (Fed. Cir. 1992) ("This court has previously found a proposed modification inappropriate for an obviousness inquiry when the modification rendered the prior art reference inoperable for its intended purpose"). Thus, one of ordinary skill in the art would not be motivated to make the substitution proposed by the Examiner.

Second, Landon teaches that its expander must be as radially thick as its upper and lower rings ("Likewise rings which use a spacer having a radial depth less than that of the control segments do not have the desired action, regardless of the materials employed"). Landon at column 1, page 2, lines 42-46. In contrast, Fall's upper and lower rings 10 and 11 are radially thicker (see flanges 10a and 11a) than expander ring 18. Thus, the combination of Fall and Landon would require a selective combination

and redesign of the references which is not motivated or suggested by the prior art. *See In re Ratti,* 270 F.3d 810, 813 (C.C.P.A. 1959).

In view the above, Fall and Landon fail to establish a prima facie case of obviousness with respect to claim 9. Claims 10, 12-13, 16 and 18 depend from claim 9 and claim 15 depends from claim 1; each is patentable based at least upon this dependency from a patentable base claim.

c) Claims 5 and 11 are patentable over Fall and Landon.

Claims 5 and 11 depend from claims 1 and 9, respectively, and are patentable based at least upon this dependency from a patentable base claim.

d) Claim 8 is patentable over Fall in view of Wuerfel.

Claim 8 depends from claim 1, and is patentable based at least upon this dependency from a patentable base claim.

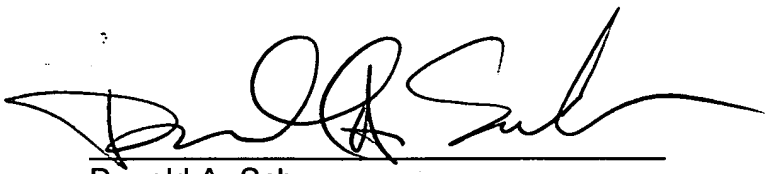
e) Claim 14 is patentable over Fall, Landon and Wuerfel.

Claim 14 depends from claim 9, and is patentable based at least upon this dependency from a patentable base claim.

CONCLUSION

Claims 1-18 are each patentable for the reasons discussed above. An expeditious determination by the Board to that effect is respectfully requested.

Respectfully submitted,



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(viii) Claims Appendix

1. A piston ring assembly, comprising:

an upper ring;

a lower ring;

wherein a first portion of said upper ring is in contact with a corresponding first portion of said lower ring; and

an expander positioned between corresponding second portions of said upper ring and said lower ring, said expander including apexes adapted to contact said second portions of said upper and lower rings;

wherein radial compression of said upper and lower rings induces axial expansion of said expander.

2. A piston ring assembly according to Claim 1, wherein upon positioning the piston ring assembly within a ring groove of a piston, said axial expansion of said expander urges said upper ring against an upper surface of said ring groove and said lower ring against a lower surface of said ring groove.

3. A piston ring assembly according to Claim 1, wherein said upper ring includes a first shoulder recess about an inner periphery thereof and said lower ring includes a second shoulder recess about an inner periphery thereof, said first and second shoulder recesses defining a cavity to receive said expander.

4. A piston ring assembly according to Claim 1, wherein said expander is generally sinusoidal in shape and includes two ends defining an expander gap such that radial compression of said upper and lower rings mates said two ends thereby closing said expander gap and said mated two ends form a generally W-shaped configuration.

5. A piston ring assembly according to Claim 1, wherein said apexes of said expander are generally flat and are supported by two adjacent leg members such that an angle defined by said adjacent leg members is about 16 degrees.

6. A piston ring assembly according to Claim 1, wherein said upper ring includes a first ring gap and said lower ring includes a second ring gap.

7. A piston ring assembly according to Claim 1, wherein said upper and lower rings each include a lip extending about an outer periphery thereof.

8. A piston ring assembly according to Claim 1, wherein one of said upper ring and said lower ring include a plurality of projections on a mating inner surface to define a plurality of vents.

9. A piston ring assembly for retention in a ring groove of a piston of an internal combustion engine, comprising:

an upper ring for bearing against an upper surface of the piston ring groove, said upper ring defining a first shoulder recess about an inner periphery thereof;

a lower ring for bearing against a lower surface of the piston ring groove, said lower ring defining a second shoulder recess about an inner periphery thereof, wherein a first portion of said upper ring is in direct contact with a corresponding first potion of said lower ring;

said first and second recesses defining a cavity; and

a generally sinusoidal expander received in said cavity, said generally sinusoidal expander having alternating apexes, said apexes adapted to contact second corresponding portions of said upper and lower rings, wherein radial compression of said upper and lower rings induces axial expansion of said generally sinusoidal

expander for urging said upper and lower rings against the upper and lower surfaces of the piston ring groove.

10. A piston ring assembly according to Claim 9, wherein said generally sinusoidal expander includes two ends defining an expander gap such that radial compression of said upper and lower rings mates said two ends, thereby closing said expander gap and said mated two ends form a generally W-shaped configuration.

11. A piston ring assembly according to Claim 9, wherein said apexes of said expander are generally flat and are supported by two adjacent leg members such that an angle defined by said adjacent leg members is about 16 degrees.

12. A piston ring assembly according to Claim 9, wherein said upper and lower rings each include a lip extending about an outer periphery thereof.

13. A piston ring assembly according to Claim 9, wherein said upper ring includes a first ring gap and said lower ring includes a second ring gap.

14. A piston ring assembly according to Claim 9, wherein one of said upper and lower rings include a plurality of projections on a mating inner surface to define a plurality of vents.

15. A piston ring assembly according to Claim 1, wherein the apexes comprise a set of upper apexes and a set of lower apexes, the set of upper apexes is spaced apart from the set of lower apexes in the axial direction of the expander, the set of upper apexes contacts the second portion of the upper ring, and the set of lower apexes contacts the second portion of the lower ring.

16. A piston ring assembly according to Claim 9, wherein the apexes comprise a set of upper apexes and a set of lower apexes, the set of upper apexes is

spaced apart from the set of lower apexes in the axial direction of the expander, the set of upper apexes contacts the second portion of the upper ring, and the set of lower apexes contacts the second portion of the lower ring.

17. A piston ring assembly according to Claim 3, wherein said cavity has a radial thickness, said expander has a radial thickness, and said expander radial thickness is greater than said cavity radial thickness.

18. A piston ring assembly according to Claim 9, wherein said cavity has a radial width, said expander has a radial width, and said expander radial thickness is greater than said cavity radial width.

(ix) Evidence Appendix

None

(x) Related Proceedings Appendix

None